

- Subj A27
1. A wireless communication system being capable of supporting link adaptation comprising:
 - a transmitter for forming fixed length radio link control (RLC) blocks, for forming fixed length coded sub-blocks from the RLC blocks, and for configuring the coded sub-blocks into transmission units being capable of supporting link adaptation at multiple code rates.
 2. The wireless communication system as recited in claim 1 comprising:
 - a receiver for receiving the transmission units and for decoding the RLC blocks from the received transmission units.
 3. The wireless communication system as recited in claim 2, wherein the transmitter comprises:
 - an adaptive rate transmitter for retransmitting at least one of the RLC blocks at a code rate which may be different from the code rate used for an initial transmission of the at least one of the RLC blocks.
 4. The wireless communication system as recited in claim 3 wherein the adaptive rate transmitter retransmits the at least one of the RLC blocks in a transmission unit which may be different than the transmission unit in which the at least one of the RLC blocks was initially transmitted.
 5. The wireless communication system as recited in claim 3, wherein the adaptive rate transmitter retransmits only a portion of a transmission unit including the at least one RLC block.
 6. The wireless communication system as recited in claim 5, wherein the adaptive rate transmitter retransmits the portion of a transmission unit comprises a integer number of the coded sub-blocks.
- Subj D17

7. The wireless communication system as recited in claim 5, wherein the adaptive rate transmitter retransmits a transmission unit comprised of coded sub-blocks which have not been transmitted previously.

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8. The wireless communications system as recited in claim 2 wherein the transmitter comprises:

an adaptive rate transmitter for transmitting at least a portion of the transmission units associated with at least one of the RLC blocks to the receiver.

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9. The wireless communications system as recited in claim 2 wherein the transmitter comprises:

an adaptive rate transmitter for transmitting the transmission units to the receiver at a retransmission code rate which is different than the code rate at which the transmission units were transmitted.

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10. The wireless communications systems as recited in claim 1 wherein the transmitter adds cyclic redundancy check sequences to the RLC blocks to form error coded RLC blocks which are configured into the coded sub-blocks.

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11. The wireless communications system as recited in claim 1 wherein the transmitter comprises:

an adaptive rate transmitter for forming the coded sub-blocks by dividing the RLC blocks by a variable value.

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12. The wireless communications system as recited in claim 9 wherein the variable value is one of 6, 12 and 18.

Sub A3

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13. A method for communicating in a wireless communication system being capable of supporting link adaptation at multiple code rates, the method comprising the steps of:

forming fixed length radio link control (RLC) blocks;
configuring the RLC blocks into transmission units being capable of supporting
link adaptation at multiple code rates; and
transmitting the transmission units.

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14. The method as recited in claim 13 wherein the step of configuring comprises the
steps of:

adding cyclic redundancy check (CRC) sequences to the RLC blocks; and

performing convolutional coding on the RLC blocks and the CRC sequences to

10 generate encoded RLC blocks.

Sub A1
15. The method as recited in claim 14 wherein the step of performing comprises the
step of performing convolutional coding uses a convolutional code rate of 1/3.

15 16. The method as recited in claim 14 wherein the step of configuring comprises the
step of interleaving the encoded RLC blocks.

17. The method as recited in claim 14 wherein the step of configuring comprises the
step of:

20 segmenting the encoded RLC blocks into G coded sub-blocks and,
wherein groups of the coded sub-blocks are assembled to form the transmission
units.

Sub A1
25 18. The method as recited in claim 17 wherein G is equal to approximately one of 6,
12 and 18.

Sub A1
19. The method as recited in claim 17 wherein the step of transmitting comprises the
step of transmitting the transmission units over GSM bursts.

SJDD17
20. The method as recited in claim 17 wherein the step of configuring comprises the step of forming the transmission units using different numbers of the coded sub-blocks to obtain multiple code rates for the link adaptation.

5 21. The method as recited in claim 17 wherein the step of configuring comprises the step of using different transmission units for an initial transmission and for a retransmission of the RLC blocks.

10 22. The method as recited in claim 17 wherein the step of configuring comprises the step of using only a portion of one of the transmission units for a retransmission of the RLC blocks.

15 23. The method as recited in claim 22 wherein the step of using only a portion comprises the step of using an integer number of the coded sub-blocks to form the portion of the one of the transmission units used for the retransmission of the RLC blocks.

24. The method as recited in claim 23 wherein the step of using an integer number comprises the step of using coded sub-blocks which have not been transmitted earlier.

CJAB5
20 25. The method as recited in claim 13 wherein the step of transmitting comprises the steps of:

forming a header indicative of the transmission units to be transmitted; and transmitting the header to indicate which transmission units are being transmitted.

CJDD17
25 26. The method as recited in claim 25 wherein the header is transmitted along with the transmission units.

27. The method as recited in claim 25 wherein the step of forming a header comprises the step of providing, in the header, at least one coded sub-block sequence number

associated with at least one of the coded sub-blocks in the transmission units to be transmitted.

28. The method as recited in claim 25 wherein the step of forming a header comprises
5 the step of providing in the header a code rate field indicative of the size and number of
transmission units to be transmitted.

29. The method as recited in claim 28 wherein the step of forming a header comprises
the step of providing in the header a temporary flow identifier indicative of which
10 receiver should receive the transmission units or which transmitter has sent the
transmission units.

30. The method as recited in claim 17 wherein the step of configuring comprises the
step of forming at least two of the transmission units of an unequal number of coded sub-
15 blocks.

Sub A67
31. The method as recited in claim 17 wherein the step of transmitting comprises the
step of transmitting the transmission units over a general packet radio services system.

20 32. A method for communicating in a wireless communication system being capable
of supporting link adaptation between multiple code rates and incremental redundancy,
the method comprising the steps of:

forming fixed length radio link control (RLC) blocks;

combining the RLC blocks with a cyclic redundancy check sequence for error

25 detection to form error coded RLC blocks;

processing the error coded RLC blocks to form coded sub-blocks;

forming a header indicative of the transmission units;

assembling groups of the coded sub-blocks into transmission units based on the
multiple code rates; and

30 transmitting the transmission units and the header to a receiver.

SyD 17
33. The method as recited in claim 32 wherein the step of processing the error coded RLC blocks comprises the steps of:

5 performing a convolutional coding on the error coded RLC blocks to generate encoded RLC blocks; and

forming the coded sub-blocks from the encoded RLC blocks.

34. The method as recited in claim 33 wherein the step of performing comprises the step of performing the convolutional coding with a 1/3 code rate.

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35. The method as recited in claim 33 wherein the step of forming the coded sub-blocks comprises the step of interleaving the encoded RLC blocks.

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36. The method as recited in claim 35 wherein the step of forming the coded sub-blocks comprises the step of segmenting the interleaved encoded RLC blocks into G coded sub-blocks and, wherein groups of the coded sub-blocks are assembled to form the transmission units.

SyD 20

37. The method as recited in claim 36 wherein the step of transmitting comprises the step of transmitting the transmission units over GSM bursts.

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38. The method as recited in claim 36 wherein at least two of the transmission units have a different number of coded sub-blocks.

39. The method as recited in claim 38 wherein the transmission units are modulated using phase shift keying.

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40. The method as recited in claim 38 wherein the transmission units are modulated using gaussian minimum shift keying.

41. The method as recited in claim 32 comprising the step of:
retransmitting at least one of the RLC blocks at a code rate which may be different
from the code rate used for an initial transmission of the at least one of the RLC blocks.

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42. The method as recited in claim 41 wherein the step of retransmitting comprises
the step of:
dropping one of the coded sub-blocks when retransmitting the transmission units.

10 43. The method as recited in claim 42 wherein the step of retransmitting comprises
the step of:

replacing the dropped one of the coded sub-blocks with extended header
information in the retransmitted transmission units.

15 44. The method as recited in claim 43 wherein the step of replacing comprises the
step of:

providing a coded sub-block sequence number in the extended header
information.

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